

## REMARKS

Claims 1-11 and 13-19 are pending in the present Application. Claim 13 has been canceled, claim 1 has been amended, Claims 16-19 have been withdrawn, and Claim 20 has been added, leaving Claims 1-11, 14-16, and 20 for consideration upon entry of the present Amendment.

Claim 1 has been amended to include the limitations of Claim 13, canceled herewith, further support for which can be found in the Specification on p. 8, lines 15-21.

In addition, new Claim 20 has been added to more specifically claim the invention, support for which can be found in the Specification on p. 11, line 13, p. 12, line 14, and generally in Examples 1-3, 5, and 6.

No new matter has been introduced by the amendments and new claims.

Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

### Claim Rejections Under 35 U.S.C. § 103(a)

Claim 1 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over U.S. Patent No. 4,071,369 (“Kurz”) further in view of U.S. Patent No. 3,762,935 (“Leach”) and U.S. Patent No. 3,942,990 (“Engstrom”) as evidenced by EP 839 778 (“EP ‘778”).

Kurz discloses a method for manufacturing porous ceramic products by mixing ceramic material which 1-35% of a fly dust containing silica and metal oxides and having a large specific surface area. Col. 4, lines 49-52. The fly dust contains a high proportion (75-92%) of silica ( $\text{SiO}_2$ ) and different metal oxides such as  $\text{MgO}$ ,  $\text{Al}_2\text{O}_3$ , and  $\text{Fe}_2\text{O}_3$ , and a specific fly dust having a composition of 70-75%  $\text{SiO}_2$ , 12-15%  $\text{Al}_2\text{O}_3$ , and 6-10% alkali. Col. 1, lines 31-45 and 57-59; Col. Col. 3, lines 57-60. In Example 2, 0.2 % by weight of SiC (silicon carbide) has been added as an oxidizing agent. Col. 5, line 43 in Example 2. Kurz discloses a clay having a composition of 17-47%  $\text{Al}_2\text{O}_3$ , 50-70% silica, 10-20% alkali, and “some organic materials”. Col. 5, lines 27-33. Kurz states that “almost all types of know clays” can be expanded by mixing with a homogeneous siliceous powder (i.e., “alkali”, which is a material having the composition of a fly dust), and that oxidizing agents such as SiC can be added when bound to each grain of the

“powder” to allow for a simultaneous reaction and uniform pore distribution. Col. 3, line 65 to Col. 4, line 6.

Leach discloses a closed or open cell foamed material. Col. 3, lines 38-40. It is described that the composition for making the article comprises aluminum hydroxide, aluminum oxide, glass frit, bentonite, metal powder, and phosphoric acid. Col. 3, lines 8-19. The glass frit comprises 24-36% silica, 10-25%  $B_2O_5$ , 15-26%  $TiO_2$ , 15-20%  $Na_2O$ , and 3-7%  $K_2O$ , 4-5%  $Li_2O$ , 1-11%  $BaO$ , up to 3%  $Sb_2O_3$ , up to 10%  $ZnO$ , and up to 3%  $Fe$ . Col. 8, lines 42-50.

Engstrom discloses a method for the manufacture of foamed ceramics from a starting composition containing (1) at least one waste product rich in silica and containing readily oxidizable substances which, when heated, are themselves capable of producing uncontrollable pore formation and/or an undesirable melt, and (2) a strongly oxidizing agent. In the composition of Engstrom *et al.*, 0.1-0.5% pore-forming agent, e.g., silicon carbide may be used. Engstrom discloses that in order for an acceptable foamed ceramic to be obtained the starting materials “shall have the following chemical composition”: 60-75%  $SiO_2$ ; 5-13%  $Al_2O_3$  plus  $Fe_2O_3$ ; ca. 2%  $CaO$ ; 0-6%  $MgO$ ; and 10-15%  $Na_2O$  plus  $K_2O$ . Col. 2, lines 38-50 (*emphasis added*).

EP ‘778 discloses a clay composition of 68-71 wt% of silica, 16-21 wt% of alumina, 0.8-1.2 wt% of  $Fe_2O_3$ , 1.1-1.7 wt%  $K_2O$ , 0.6 to 1.2 wt% of  $CaO$ , 1.5-2.6 wt% of  $MgO$ , 0.6 to 1.3 wt% of  $Na_2O$ , 0.3-0.4 wt% of  $TiO_3$ , and 0.005-0.02 wt% of enzyme. See table in Abstract and on p. 3. The composition is molded and fired into an article having “a number of interconnected fine pores.” See p. 4, lines 53-58.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, or knowledge generally available in the art at the time of the invention, must provide some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). “A patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1741 (2007). To find obviousness, the Examiner must “identify a reason that would have prompted a person of ordinary skill in the art in the relevant field to combine the elements in the way the claimed new invention does.” *Id.*

The amended claims are directed to a super light weight ceramic panel having closed pore structures produced by trapping carbon dioxide gas and oxygen gas, which is formed from a composition containing 90 to 98% by weight of an expandable clay mineral, 1 to 5% by weight of glass, and 0.5 to 5% by weight of silicon carbide, wherein the expandable clay mineral consists essentially of 61.5 to 70% by weight of  $\text{SiO}_2$ , 15 to 20% by weight of  $\text{Al}_2\text{O}_3$ , 1 to 5% by weight of  $\text{Fe}_2\text{O}_3$ , 2 to 4% by weight of  $\text{CaO}$ , 1 to 3% by weight of  $\text{MgO}$ , 0.5 to 1.5% by weight of  $\text{K}_2\text{O}$  and 2 to 5% by weight of  $\text{Na}_2\text{O}$ .

Regarding the rejection of instant Claim 1 as amended over the combination of Kurz in view of Leach and Engstrom (evidenced by EP '778), though Kurz discloses a porous ceramic products manufactured from a composition of ceramic material, a fly dust containing silica and metal oxide, optionally including small amounts (e.g., 0.2 wt%) of SiC as oxidizing agent, Kurz does not disclose the clay composition claimed in Claim 13, now canceled and the contents of which are incorporated in instant Claim 1. Particularly, though Kurz discloses that it is possible to expand almost all types of known clays, Kurz states that the clay may be *modified* if poor in alkali (wherein it can be *admixed* with minor quantities of water glass or alkali metal silicate, caustic soda, or the like), and likewise though Kurz states that unexpandable clays such as those "high" in CaO content may be made expandable by inclusion of the appropriate composition fly dust. Col. 4, lines 17-45. Therefore Kurz, though broadly disclosing a wide variety of clays, fails to disclose the clay material claimed in Claim 1, and only teaches generic modification of a clay to provide a desired composition. As to the Further, though Leach discloses a glass frit, the composition differs significantly from that of the instant claims and therefore does not read upon that of the clay mineral claimed in instant Claim 1. Engstrom explicitly discloses a clay with a composition that includes 5-13%  $\text{Al}_2\text{O}_3$  plus  $\text{Fe}_2\text{O}_3$  and 10-15%  $\text{Na}_2\text{O}$  plus  $\text{K}_2\text{O}$ . Claim 1 as amended claims a clay having a *minimum* of 16% combined weight percentage of  $\text{Al}_2\text{O}_3$  plus  $\text{Fe}_2\text{O}_3$  which is 3% higher than that taught in Engstrom, and a *maximum* of 6.5 wt% of  $\text{K}_2\text{O}$  and  $\text{Na}_2\text{O}$  which is 3.5% lower than that taught in Engstrom; thus there is no overlap of these ranges between Engstrom and instant Claim 1. EP '778 discloses a composition having a *maximum* CaO content of 1.2 wt%, which is 0.8 wt% less than that claimed in Claim 1, and a *maximum*  $\text{Na}_2\text{O}$  content of 1.3 wt% which is 0.7 wt% less than that claimed in Claim 1, thus there is no overlap of these ranges between EP '778 and instant Claim 1. It will be appreciated that the clay compositions of

Engstrom and as evidenced by EP'778 thus fail to disclose the clay material composition of instant Claim 1. Hence, none of Leach, Engstrom, or EP '778 provide the compositional limitations lacking in Kurz, and therefore the combination of Kurz in view of Leach, Engstrom, and as evidenced by EP '778 fails to teach all elements of the instant claims, and cannot provide a prima facie case of obviousness.

One skilled in the art will further appreciate that the language of Engstrom, which states that the starting material “*shall* have the following chemical composition” disclosed therein is by choice of words unequivocal that the composition of Engstrom not vary from the proportions of components set forth therein, and therefore Engstrom clearly teaches away from any modification to the composition of the starting material by evidentiary material of EP '0778 or the nonspecific disclosure of Kurz.

There is further no suggestion or incentive that would lead one skilled in the art to combine Kurz, Leach, and Engstrom (and as evidenced by EP '778) to provide a ceramic composition having closed cell structure containing glass, and the desired properties as claimed in the instant claims, and as disclosed in the instant specification. The courts have held that “[i]f the proposed modification would render the prior art invention being modified unsatisfactorily for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon* 733 F. 2d 900, 221 USPQ 1125 (Fed. Cir. 1984). The courts have also held that “[i]f the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious.” *In re Ratti* 270 F. 2d 810, 123 USPQ 349 (CCPA 1959).

With regard to combining Kurz (which does not contain glass and discloses “mainly closed pores”; see Abstract) with Leach (which contains glass frit but no clay and discloses a cellular material with open cells or closed cells; see Col. 3, lines 38-40) and Engstrom (which contains no glass and discloses a closed pore structure; see Col. 4, lines 55-59) evidenced by EP '778 (which contains no glass and discloses an “interconnected fine porous structure”, i.e., an open cell pore; see p. 5, lines 15-23) there is thus no clear evidence that would lead one skilled in the art to expect that the combination would provide a closed cell material over an open-cell material, or that the pores would remain unconnected by adding glass. Thus as Kurz and Engstrom do not disclose the inclusion of glass in a closed cell composition, there can be no reasonable expectation that

including the limitation of Leach would remedy this deficiency. *In re Laskowski*, 871 F.2d 115, 117, 10 U.S.P.Q.2d 1397, 1398 (Fed. Cir. 1989) (“Although the Commissioner suggests that [the structure in the primary art reference] could readily be modified to form the [claimed] structure, ‘[t]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification’”) (citation omitted); *In re Stencel*, 828 F.2d 751, 755, 4 U.S.P.Q.2d 1071, 1073 (Fed. Cir. 1987) (obviousness cannot be established “by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion that the combination be made”). There is no teaching or suggestions to combine elements of the prior art to produce the present invention.

It is also stated in the Final Office Action that Kurz as modified by Leach/Engstrom would have properties including pore density, pore volume, flex strength, etc. that are “inherently present as like material has like property”. Final Office Action dated April 21, 2008, p. 3 (section 3, final paragraph). As discussed hereinabove, the composition of Claim 1, in particular the composition of the clay material, is not identical to that of any of the clay materials disclosed in Kurz in view of Leach/Engstrom evidenced by EP ’778, and hence any assertion that the properties of the composition of the instant claims must necessarily be the same as those of the combination of references cannot be maintained. In addition, and significantly, the Examiner is respectfully reminded that the theory of inherency is normally reserved for rejections under 35 U.S.C. § 102. *In re Grasselli*, 318 U.S.P.Q. 303 (Fed. Cir. 1983). The courts have repeatedly made the distinction that “the inherency of an advantage and its obviousness are entirely different questions. That which may be inherent is not necessarily known. Obviousness cannot be predicated on what is unknown.” *In re Spormann*, 150 U.S.P.Q. 449, 452, (CCPA, 1966), citing *In re Adams*, 53 CCPA 996, 356 F.2d 998, 148 U.S.P.Q. 742. “Further it confuses anticipation by inherency, i.e., lack of novelty, with obviousness, which though anticipation is the epitome of obviousness, are separate and distinct concepts.” *Jones et al. v. Hardy*, 220 U.S.P.Q. 1021, 1025 (CCPA, 1984) citing *In re Pearson*, 494 F.2d 1399, 181 U.S.P.Q. 641 (CCPA, 1974); *In re Oelrich*, 666 F.2d 578, 212 U.S.P.Q. 323 (CCPA, 1981). Any use of the theory of inherency in maintaining a rejection of the instant claims under 35 U.S.C. § 103 would therefore not be proper, and withdrawal of any such rejection is respectfully requested.

Thus, the combination of Kurz, Leach and Engstrom evidenced by EP '778 fails to disclose all limitations of the instant claims, i.e., the composition of the clay material claimed in Claim 1, and the combination fails to teach or suggest the invention as claimed. Reconsideration and allowance of the claims is respectfully requested.

Claims 14-15 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Kurz in view of Leach and Engstrom as evidenced by EP '778 as applied to claim 1 above, and further in view of U.S. Patent No. 3,727,838 ("Bergh"). In addition, Claim 16 stands rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Kurz in view of Leach and Engstrom as evidenced by EP '778 as applied to claim 1 above, and further in view of, further in view of Romanian Patent No. RO 114015 ("RO '015"). Applicants respectfully traverse both of these rejections.

As described above, Kurz in view of Leach and Engstrom evidenced by EP '778 fails to teach or discloses all elements of the instant claims, and the combination fails to teach or suggest the invention as claimed. Thus, each of these rejections is moot, as Bergh and RO '015 each fail to remedy the deficiencies of Kurz, Leach, Engstrom, and as evidenced by EP '778 of the composition of the clay material, and hence the combinations of any of these references fail to disclose or teach all elements of the composition of Claim 1. Accordingly, the combinations of Kurz in view of Leach, Engstrom (as evidenced by EP '778) in view of Bergh or RO '015, fail to render the instant claims unpatentable. Reconsideration and allowance of these claims (Claims 14-16) is respectfully requested

Therefore, the cited references, alone or in combination, fail to teach or disclose all limitations of the instant claims, and the combinations do not provide a teaching or suggestion that would motivate one skilled in the art to modify the references to provide the claimed invention.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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